

What is claimed is:

1. An image processing apparatus, comprising:

an exposing device for exposing an image forming material so as to form a latent image on the image forming material based on image data;

a developing device for developing and visualizing the latent image on the exposed image forming material so as to form an image;

a measuring device for measuring the image density of the image on the developed image forming material;

a calibrating device for forming a table to define a relation between an image signal and image density on the basis of plural different test image data and measured-image densities thereof;

a storing device for storing a characteristic change model indicating a characteristic change of at least one of the exposing device and the developing device with time;

a difference calculating device to calculate a density difference on the basis of the characteristic change model between the time of forming the table and the time of forming an image based on image signal of diagnostic image data; and

a correcting device for correcting the table on the basis of the density difference calculated by the difference calculating device.

2. The image processing apparatus of claim 1, wherein said storing device stores said characteristic change model that starts at the time of the turning-on of the power source.

3. The image processing apparatus of 1, wherein the characteristic change model is a predetermined characteristic change model installed from the outside.

4. The image processing apparatus of claim 1, wherein the characteristic change model is an actual characteristic change model obtained based on image densities measured by the measuring device with the processing of the image forming materials.

5. An image processing apparatus, comprising:

an exposing device for exposing an image forming material so as to form a latent image on the image forming material based on image data;

a developing device for developing and visualizing the latent image on the exposed image forming material so as to form an image;

a measuring device for measuring the image density of the image on the developed image forming material;

a calibrating device for forming a table to define a relation between an image signal and image density thereof on the basis of plural different test image data and measured-image densities thereof;

a storing device for storing a passage-time film characteristic model that is the change with time of a characteristic of the image forming material; and

a difference calculating device to calculate a density difference on the basis of the passage-time film characteristic model between the time of forming the table and the time of forming an image based on image signal of diagnostic image data; and

a correcting device for correcting the table on the basis of the density difference calculated by the difference calculating device.

6. The image processing apparatus of claim 5, wherein said storing device stores a result data obtained by exposing to a

part of the image forming material with a light quantity through the table corresponding to a predetermined density at the time of forming a diagnosis image and measuring a density on the part of the image forming material on which the diagnosis image is formed, wherein the image processing apparatus further comprises:

- a first controlling device for controlling at least one of the exposing device and the developing device in such a way as to offset the characteristic change of the exposing device and the developing device;

- a first estimation device for calculating and keeping a characteristic change of the image forming material on the basis of the result data; and

- a second controlling device for controlling at least one of the exposing device and the developing device on the basis of the first estimation device in such a way as to offset the characteristic change of the image forming material instead of stored passage-time film characteristic model.

7. The image processing apparatus of claim 6, further comprising:

a clearing device for clearing off the characteristic change made by the first estimation device at the time of preparation of the table by the calibrating device or at the time of operation of the second controlling device.

8. The image processing apparatus of claim 7, wherein the first controlling device and the second controlling device are carried out when an image formation is resumed after a stop of the apparatus for a period of time not shorter than a predetermined time.

9. The image processing apparatus of claim 6, wherein said first estimation device calculate and keep a characteristic change of the image forming material every time the apparatus stops for a predetermined period of time.

10. The image processing apparatus of claim 5, wherein said storing device stores a result data obtained by exposing to a part of the image forming material with a light quantity through the table corresponding to a predetermined density at the time of forming a diagnosis image and measuring a density on the part of the image forming material on which the

diagnosis image is formed, wherein the image processing apparatus further comprises:

- a holder for holding the image forming material;

- a first controlling device for controlling at least one of the exposing device and the developing device in such a way as to offset the characteristic change of the exposing device and the developing device;

- a third controlling device for controlling at least one of the exposing device and the developing device on the basis of the difference between the result of the density measured on the part of the image forming material and a predetermined density for comparison during a predetermined period of time after loading the holder to the apparatus;

- a second estimation device for calculating and keeping a characteristic change of the image forming material through the amount of the control carried out lastly in said third controlling device and the result of the density measured in the storing device after a predetermined period of time after loading the holder to the apparatus; and

- a fourth controlling device for controlling at least one of the exposing device and the developing device on the basis of the second estimation device in such a way as to offset the characteristic change of the image forming

material instead of stored passage-time film characteristic model.

11. The image processing apparatus of claim 10, further comprising:

a clearing device for clearing off the characteristic change made by the second estimation device at the time of preparation of the table by the calibrating device or at the time of operation of the fourth controlling device.

12. The image processing apparatus of claim 11, wherein the first controlling device and the fourth controlling device are carried out when an image formation is resumed after a stop of the apparatus for a period of time not shorter than a predetermined time.

13. The image processing apparatus of claim 10, wherein said second estimation device calculates and keeps a characteristic change of the image forming material every time the apparatus stops for a predetermined period of time.

14. An image processing apparatus, comprising:

an exposing device for exposing an image forming material so as to form a latent image on the image forming material based on image data;

a developing device for developing and visualizing the latent image on the exposed image forming material so as to form an image;

a measuring device for measuring the image density of the image on the developed image forming material;

a calibrating device for forming a table to define a relation between an image signal and image density thereof on the basis of plural different test image data and measured-image densities thereof;

a first storing device for storing a characteristic change model that is at least one of the changes with time of a characteristic of the exposing device and the developing device;

a second storing device for storing a passage-time film characteristic model that is the change with time of a characteristic of the image forming material; and

a difference calculating device to calculate a density difference on the basis of the characteristic change model and the passage-time film characteristic model between the

time of forming the table and the time of forming an image based on image signal of diagnostic image data; and

a correcting device for correcting the table on the basis of the density difference calculated by the difference calculating device.

15. The image processing apparatus of claim 14, wherein said first storing device stores said characteristic change model for a change starting from the point of time of the turning-on of the power source.

16. A method of an image processing, comprising the steps of:

exposing for exposing an image forming material so as to form a latent image on the image forming material based on image data;

developing for developing and visualizing the latent image on the exposed image forming material so as to form an image;

measuring for measuring the image density of the image on the developed image forming material;

calibrating for forming a table to define a relation between an image signal and image density thereof on the

basis of plural different test image data and measured-image densities thereof;

storing for storing a characteristic change model indicating a characteristic change of at least one of an exposing device and an developing device with time;

difference calculating to calculate a density difference on the basis of the characteristic change model between the time of forming the table and the time of forming an image based on image signal of diagnostic image data; and

correcting for correcting the table on the basis of the density difference calculated by the difference calculating.

17. The method of claim 16, wherein said storing step stores the characteristic change model that starts at the time of the turning-on of the power source.

18. The method of claim 16, wherein said characteristic change model is a predetermined characteristic change model installed from the outside.

19. The method of claim 16, wherein said characteristic change model is an actual characteristic change model

obtained based on image densities measured by the measuring device with the processing of the image forming materials.

20. A method of an image processing, comprising the steps of:

exposing for exposing an image forming material so as to form a latent image on the image forming material based on image data;

developing for developing and visualizing the latent image on the exposed image forming material so as to form an image;

measuring for measuring the image density of the image on the developed image forming material;

calibrating for forming a table to define a relation between an image signal and image density thereof on the basis of plural different test image data and measured-image densities thereof;

storing for storing a passage-time film characteristic model that is the change with time of a characteristic of the image forming material; and

difference calculating to calculate a density difference on the basis of the passage-time film characteristic model between the time of forming the table

and the time of forming an image based on image signal of diagnostic image data; and

correcting for correcting the table on the basis of the density difference calculated by the difference calculating.

21. The method of claim 20, wherein said storing step stores a result data obtained by exposing to a part of the image forming material with a light quantity through the table corresponding to a predetermined density at the time of forming a diagnosis image and measuring a density on the part of the image forming material on which the diagnosis image is formed, wherein the method further comprises the steps of:

first controlling for controlling at least one of an exposing device and a developing device in such a way as to offset the characteristic change of the exposing device and the developing device;

first estimating for calculating and keeping a characteristic change of the image forming material on the basis of the result data; and

second controlling for controlling at least one of the exposing device and the developing device on the basis of the first estimating step in such a way as to offset the

characteristic change of the image forming material instead of stored passage-time film characteristic model.

22. The method of claim 21, further comprising the step of:
clearing for clearing off the characteristic change obtained by the first estimating step at the time of preparation of the table by the calibrating step or at the time of operation of the second controlling step.

23. The method of claim 21, wherein the first controlling step and the second controlling step are carried out when an image processing is resumed after a stop of the image processing for a period of time not shorter than a predetermined time.

24. The method of claim 21, wherein said first estimation step calculates and keeps a characteristic change of the image forming material every time the image processing stops for a predetermined period of time.

25. The method of claim 20, wherein said storing step stores a result data obtained by exposing to a part of the image forming material with a light quantity through the

table corresponding to a predetermined density at the time of forming a diagnosis image and measuring a density on the part of the image forming material on which the diagnosis image is formed, wherein the method further comprises the steps of:

loading a holder which holds an image forming material to an image processing apparatus including an exposing device and a developing device;

first controlling for controlling at least one of an exposing device and a developing device in such a way as to offset the characteristic change of the exposing device and the developing device;

third controlling for controlling at least one of the exposing device and the developing device on the basis of the difference between the result of the density measured on the part of the image forming material and a predetermined density for comparison during a predetermined period of time after loading the holder to the apparatus;

second estimating for calculating and keeping a characteristic change of the image forming material through the amount of the control carried out lastly in the third controlling step of the result of the density measured in the storing step after a predetermined period of time after loading the holder to the apparatus; and

fourth controlling for controlling at least one of the exposing device and the developing device on the basis of the second estimating step in such a way as to offset the characteristic change of the image forming material instead of stored passage-time film characteristic model.

26. The method of claim 25, further comprising the step of:

clearing for clearing off the characteristic change obtained by the second estimating step at the time of preparation of the table by the calibrating step or at the time of operation of the fourth controlling step.

27. The method of claim 25, wherein the first controlling step and the fourth controlling step are carried out when an image formation is resumed after a stop of the apparatus for a period of time not shorter than a predetermined time.

28. The method of claim 25, wherein said second estimation step calculates and keeps a characteristic change of the image forming material every time the apparatus stops for a predetermined period of time.

29. A method of an image processing comprising the steps of:

exposing for exposing an image forming material so as to form a latent image on the image forming material based on image data;

developing for developing and visualizing the latent image on the exposed image forming material so as to form an image;

measuring for measuring the image density of the image on the developed image forming material;

calibrating for forming a table to define an relation between an image signal and image density thereof on the basis of plural different test image data and measured-image densities thereof;

first storing for storing a characteristic change model that is at least one of the changes with time of a characteristic of an exposing device and a developing device;

second storing for storing a passage-time film characteristic model that is the change with time of a characteristic of the image forming material; and

difference calculating to calculate a density difference on the basis of the characteristic change model and the passage-time film characteristic model between an

image density at the time of forming the table and an image density at the time of forming an image based on image signal of diagnostic image data; and

correcting for correcting the table on the basis of the density difference calculated by the difference calculating.

30. The method of claim 29, wherein said first storing step stores said characteristic change model that starts at the time of the turning-on of the power source.

31. A computer program to control a computer to function as an image processor, wherein the image processor comprises:

an exposing function for exposing an image forming material so as to form a latent image on the image forming material based on image data;

a developing function for developing and visualizing the latent image on the exposed image forming material so as to form an image;

a measuring function for measuring the image density of the image on the developed image forming material;

a calibrating function for forming a table to define an relation between an image signal and image density thereof on

the basis of plural different test image data and measured-image densities thereof;

a storing function for storing a characteristic change model indicating a characteristic change of at least one of an exposing device and an developing device with time;

a difference calculating function to calculate a density difference on the basis of the characteristic change model between the time of forming the table and the time of forming an image based on image signal of diagnostic image data; and

a correcting function for correcting the table on the basis of the density difference calculated by the difference calculating.

32. The computer program of claim 31, wherein said storing function stores the characteristic change model that starts at the time of the turning-on of the power source.

33. The computer program of claim 31, wherein said characteristic change model is a predetermined characteristic change model installed from the outside.

34. The computer program of claim 31, wherein said characteristic change model is an actual characteristic change model obtained based on image densities measured by the measuring function with the processing of the image forming materials.

35. A computer program to control a computer to function as an image processor, wherein the image processor comprises:

- an exposing function for exposing an image forming material so as to form a latent image on the image forming material based on image data;

- a developing function for developing and visualizing the latent image on the exposed image forming material so as to form an image;

- a measuring function for measuring the image density of the image on the developed image forming material;

- a calibrating function for forming a table to define a relation between an image signal and image density thereof on the basis of plural different test image data and measured-image densities thereof;

- a storing function for storing a passage-time film characteristic model that is the change with time of a characteristic of the image forming material; and

a difference function calculating to calculate a density difference on the basis of the passage-time film characteristic model between the time of forming the table and the time of forming an image based on image signal of diagnostic image data; and

a correcting function for correcting the table on the basis of the density difference calculated by the difference calculating.

36. The computer program of claim 35, wherein said storing function stores a result data obtained by exposing to a part of the image forming material with a light quantity through the table corresponding to a predetermined density at the time of forming a diagnosis image and measuring a density on the part of the image forming material on which the diagnosis image is formed, wherein the image processor further comprises:

a first controlling function for controlling at least one of an exposing device and a developing device in such a way as to offset the characteristic change of the exposing device and the developing device;

a first estimating function for calculating and keeping a characteristic change of the image forming material on the basis of the result data; and

a second controlling function for controlling at least one of the exposing device and the developing device on the basis of the first estimating step in such a way as to offset the characteristic change of the image forming material instead of stored passage-time film characteristic model.

37. The computer program of claim 36, wherein the image processor further comprises:

a clearing function for clearing off the characteristic change obtained by the first estimating at the time of preparation of the table by the calibrating or at the time of operation of the second controlling.

38. The computer program of claim 36, wherein the first controlling function and the second controlling function are carried out when an image processing is resumed after a stop of the image processing for a period of time not shorter than a predetermined time.

39. The computer program of claim 36, wherein said first estimation function calculates and keeps a characteristic change of the image forming material every time the image processing stops for a predetermined period of time.

40. The computer program of claim 35, wherein said storing function stores a result data obtained by exposing to a part of the image forming material with a light quantity through the table corresponding to a predetermined density at the time of forming a diagnosis image and measuring a density on the part of the image forming material on which the diagnosis image is formed, wherein the image processor further comprises:

- a loading function for loading for a holder which holds an image forming material to an image processing apparatus including an exposing device and a developing device;

- a first controlling function for controlling at least one of the exposing device and the developing device in such a way as to offset the characteristic change of the exposing device and the developing device;

- a third controlling function for controlling at least one of the exposing device and the developing device on the basis of the difference between the result of the density

measured on the part of the image forming material and a predetermined density for comparison during a predetermined period of time after loading the holder to the apparatus;

a second estimating function for calculating and keeping a characteristic change of the image forming material through the amount of the control carried out lastly in the third controlling step of the result of the density measured in the storing step after a predetermined period of time after loading the holder to the apparatus; and

a fourth controlling function for controlling at least one of the exposing device and the developing device on the basis of the second estimating step in such a way as to offset the characteristic change of the image forming material instead of stored passage-time film characteristic model.

41. The computer program of claim 40, wherein the image processor further comprises:

a clearing function for clearing off the characteristic change obtained by the second estimating at the time of preparation of the table by the calibrating or at the time of operation of the fourth controlling.

42. The computer program of claim 40, wherein the first controlling function and the fourth controlling function are carried out when an image formation is resumed after a stop of the apparatus for a period of time not shorter than a predetermined time.

43. The computer program of claim 40, wherein said second estimation function calculates and keeps a characteristic change of the image forming material every time the apparatus stops for a predetermined period of time.

44. A computer program to control a computer to function as an image processor, wherein the image processor comprises:

- an exposing function for exposing an image forming material so as to form a latent image on the image forming material based on image data;

- a developing function for developing and visualizing the latent image on the exposed image forming material so as to form an image;

- a measuring function for measuring the image density of the image on the developed image forming material;

- a calibrating function for forming a table to define an relation between an image signal and image density thereof on

the basis of plural different test image data and measured-image densities thereof;

a first storing function for storing a characteristic change model that is at least one of the changes with time of a characteristic of an exposing device and a developing device;

a second storing function for storing a passage-time film characteristic model that is the change with time of a characteristic of the image forming material; and

a difference calculating function to calculate a density difference on the basis of the characteristic change model and the passage-time film characteristic model between an image density at the time of forming the table and an image density at the time of forming an image based on image signal of diagnostic image data; and

a correcting function for correcting the table on the basis of the density difference calculated by the difference calculating.

45. The computer program of claim 44, wherein said first storing function stores said characteristic change model that starts at the time of the turning-on of the power source.